these problems. The overall success rate for microvascular free flap reconstruction now approaches 95% when done by skilled, well-trained microvascular surgeons.

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Spasmodic Dysphonia and Laryngeal Botulinum Toxin Injection

SPASMODIC DYSPHONIA is a voice disorder characterized by intermittent, involuntary tightening or constriction of the larynx during phonation. The interruption of air flow results in staccato, jerking, labored speech (adductor spasmodic dysphonia). Occasionally vocal spasms can abduct or separate the vocal folds, resulting in breathy voice breaks (abductor spasmodic dysphonia). The severe impairment in communication that results from this unusual condition often causes patients to lose or change their jobs. In the past, patients were frequently thought to have underlying emotional conflicts or psychopathology for which the voice problem was a manifestation. Psychological and speech therapy generally yielded poor results and left patients frustrated. Surgical therapy with unilateral recurrent laryngeal nerve section yielded initially good results. It also "legitimized" spasmodic dysphonia as a treatable condition. In long-term follow-up, however, spasmodic dysphonia symptoms recurred following surgical therapy in many patients.

Over the past ten years, the integration of research efforts from many contributors has provided a new framework for understanding the underlying causes of this problem. "Spasmodic dysphonia" is now thought to be a focal laryngeal manifestation of dystonia, a neurologic condition analogous to the focal dystonias of writer's cramp, blepharospasm, and torticollis. As with other dystonias, a patient with laryngeal dystonia may have other affected areas (such as in Meige's syndrome or orofacial dystonia) and may have a family history of dystonia.

The treatment of spasmodic dysphonia has evolved from a scattered variety of psychological, behavioral, medical, and surgical therapies to direct first-line myoneural blockade with botulinum toxin. Botulinum toxin was first developed in the 1970s and 1980s as an alternative agent for the treatment of blepharospasm and strabismus. At a recent consensus conference of the National Institutes of Health, botulinum toxin was deemed safe and effective in the treatment of adductor spasmodic dysphonia.

Botulinum toxin is typically administered intralaryngeally in an electromyography laboratory. Adductor spasmodic dysphonia treatment is given by placing a hollow needle electrode percutaneously through the cricothyroid membrane and into the thyroarytenoid muscle, using electromyography during phonation to locate the muscle, which functions as a laryngeal adductor. After localization, the toxin is administered through the needle electrode. When electromyography is not used, the toxin may also be administered percutaneously into the thyroarytenoid muscle through the thyroid cartilage or by a transoral route, visualizing the vocal folds indirectly with a fiberscope or mirror. The toxin may be given unilaterally or bilaterally. Depending on the dosages used, an initially breathy voice is followed in three to six months by improved phonation. For many patients, this means a return to employment. As nerve regenerates, symptoms return, and patients may again undergo treatment with botulinum toxin. The abductor variety is treated by administering the toxin to the posterior cricoarytenoid muscle; this technique carries a higher risk of airway difficulties developing, and the voice results to date have not been as promising.

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Endoscopic Sinus Surgery

THE FOUNDATIONS OF endoscopic sinus surgery, also known as functional endoscopic sinus surgery, are based on understanding the structure and function of the paranasal sinuses. The surgical rationale, approach, and techniques have evolved over the past two decades. Today this procedure has replaced the ablative paranasal sinus procedures such as Caldwell-Luc, nasal-antral windows, and external ethmoidectomy.

Of patients with chronic sinusitis, 90% or more have chronic nasal obstruction, postnasal drainage, and facial pain or headaches. In patients in whom antibiotics and appropriate treatment directed at allergic nasal reactions are not effective, nasal cytologic examination and sinus computed tomographic scans should be done. If appropriate therapy with antibiotics, environmental control, and nasal corticosteroids as indicated by the evaluation does not resolve the patients' chronic sinusitis, surgical intervention is indicated. The indications for an endoscopic sinus operation are, therefore, chronic sinusitis refractory to medical treatment. Whether a condition is refractory to medical treatment is a decision made by patients when they feel that they have tried medications and are simply fed up with the disease and the lack of improvement.

The subjective results of endoscopic sinus surgery are excellent. In a recent large series with 18- to 24-month follow-up, 85% to 90% of patients had good to excellent symptomatic relief. Some patients with recurrent sinusitis may need antibiotic therapy but tend to respond quickly.